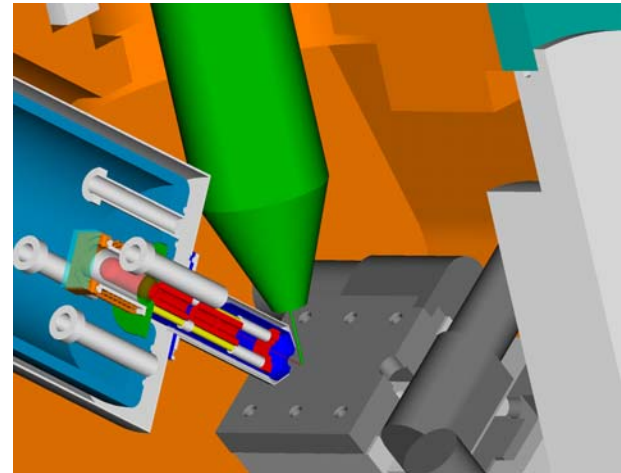
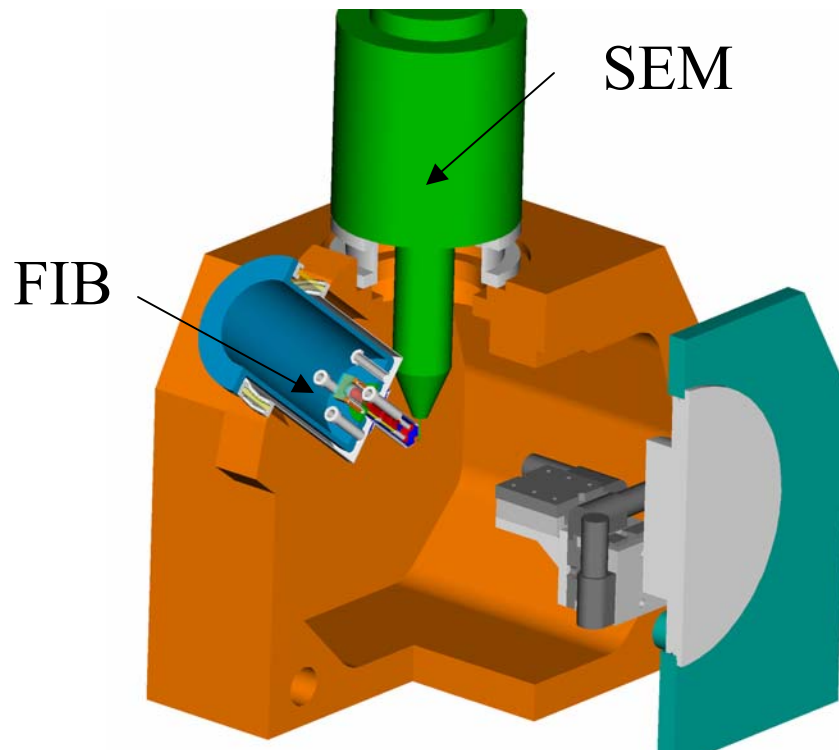


# Development of a Dual-Beam System with Multi-Ion Capability

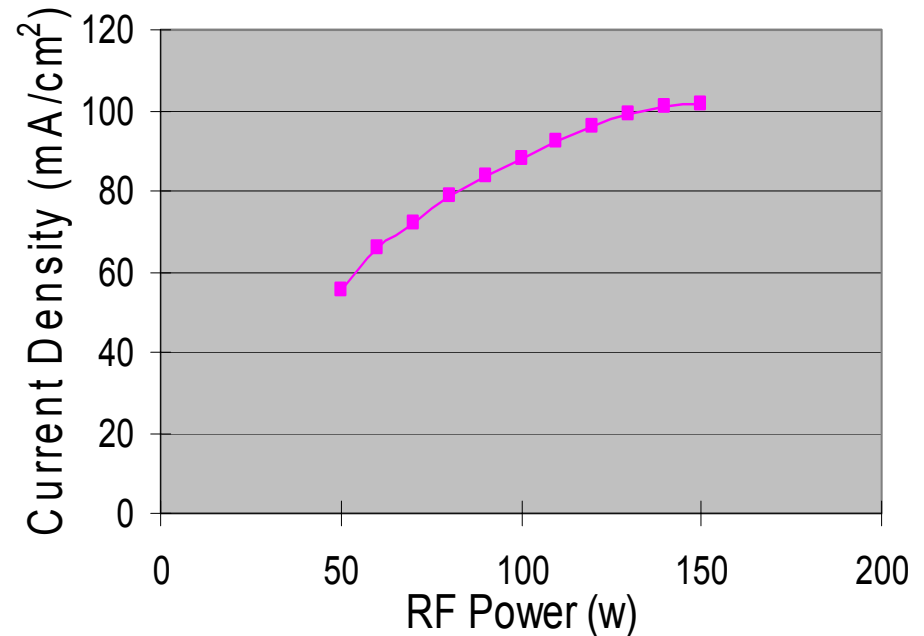
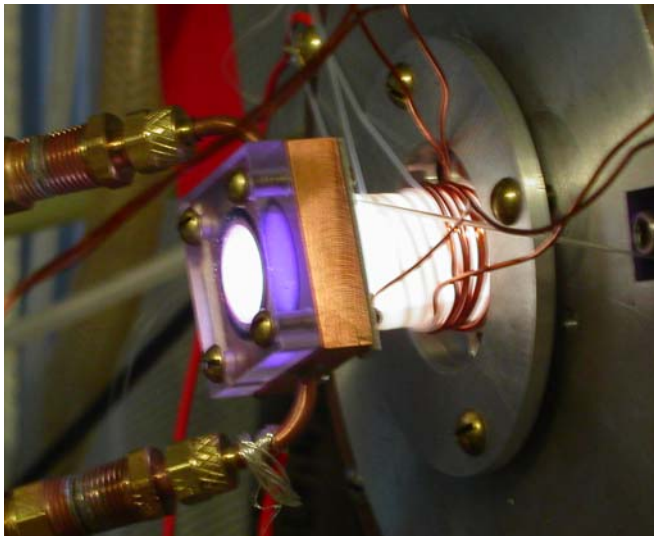
**A new tool for ion beam processing.** The system consists of a focused ion beam (FIB) system for micromachining and direct-write/implantation, and a compact electron beam system which is configured as a Scanning Electron Microscope (SEM) for *in-situ* imaging. A mini-rf plasma source with external antenna has been developed for the FIB system. One of the advantages of such an ion source is that it can produce a variety of ion species, such as noble gas, oxygen, boron, phosphorus, etc. This system will be an important improvement to the FIB system that will facilitate new fabrication and research with selected ions and improved accuracy.



Schematic diagrams of the dual beam system which is under development.

# Development of a Dual-Beam System with Multi-Ion Capability

We've finished developing a small rf ion source with external antenna and tested it using argon ions. A pure electrostatic column has been designed to extract the beam from the source, accelerate to the desired energy, and focus down to sub-micron beam spot size. The ion column will be finished and tested by the end of this year. It will be integrated with the SEM next year.



The above figure shows an argon plasma generated by the rf source with external double layered copper wire antenna. The diameter of the source chamber is about 1.5 cm. The current density can reach 50 mA/cm<sup>2</sup> for a modest 40 W input rf power.